WHAT IS CLAIMED IS:

1. An optical disk which is constructed in such a manner that an information recording layer formed on a substrate is covered with a light transmission layer and in which the range of the thickness and the refractive index of the light transmission layer is set so that aberration due to a deviation of the thickness and the refractive index of the light transmission layer from each standard value falls within the range of certain acceptable values, wherein

the thickness t of the light transmission layer is set within the range of $f(n) - t1 \leq t \leq f(n) + t2$, employing function f(n) of the refractive index n of the light transmission layer and constants t1, t2 determined based on an acceptable value of aberration in the light transmission layer,

the refractive index of the light transmission layer is set within the range of 1.45 to 1.75,

the numerical aperture of a lens emitting laser light which is incident onto the light transmission layer is set to 0.65, and

the function f(n) is shown by

$$f(n) = \frac{A_1 \times n^3}{n^2 - 1} \times \frac{n^2 + A_2}{n^2 + A_3} \quad (\mu m)$$

employing constants A_1, A_2, A_3.

2. The optical disk according to claim 1, wherein the refractive index of the light transmission layer is

set within the range of 1.5 to 1.7.

3. The optical disk according to claim 1, wherein the wavelength of the laser light which is incident onto the light transmission layer is set within the range of 395 to 415 nm.

4. The optical disk according to claim 1, wherein the constant A_1 is 0.26200, constant A_2 is -0.32400, and constant A_3 is 0.00595.

5. The optical disk according to claim 1, wherein minimum values of the constants t1, t2 are substantially set to 10 μm.

6. The optical disk according to claim 1, wherein the constants t1, t2 are substantially set to 13 μm.

7. The optical disk according to claim 1, wherein predetermined positions on curved lines that f(n) - t1 and f(n) + t2 show are sampled, and an area encircled by connecting each sample point by means of straight lines is set as the range of the thickness t of the light transmission layer.

8. An optical disk which is constructed in such a manner that a plurality of information recording layers are laminated by sandwiching a space layer having a light transmission property therebetween on a substrate and are covered with a light transmission layer, wherein

the thickness t of the light transmission layer is set to f(n) - t1 or more, employing function f(n) of

the refractive index n of the light transmission layer and constants t1, t2 determined based on an acceptable value of aberration in the layer comprising the light transmission layer, the information recording layers, and the space layer,

the sum of thicknesses of the light transmission layer, the space layer, and the information recording layer excluding the information recording layer which is closest to the substrate is set to f(n) + t2 or less,

the refractive index of the light transmission layer is set within the range of 1.45 to 1.75,

the refractive index of the space layer is set within the range of +0.0 to -0.15 of the refractive index of the light transmission layer,

the numerical aperture of a lens emitting laser light which is incident onto the light transmission layer is set to 0.65, and

the function f(n) is shown by

$$f(n) = \frac{A_1 \times n^3}{n^2 - 1} \times \frac{n^2 + A_2}{n^2 + A_3} \quad (\mu m)$$

employing constants A_1, A_2, A_3.

9. The optical disk according to claim 8, wherein the refractive index of the light transmission layer is set within the range of 1.5 to 1.7.

10. The optical disk according to claim 8, wherein the wavelength of the laser light which is incident

onto the light transmission layer is set within the range of 395 to 415 nm.

11. The optical disk according to claim 8, wherein the constant A_1 is 0.26200, constant A_2 is -0.32400, and constant A_3 is 0.00595.

12. The optical disk according to claim 8, wherein minimum values of the constants t1, t2 are substantially set to 10 μm.

13. The optical disk according to claim 8, wherein the constants t1, t2 are substantially set to 22 μm.

14. The optical disk according to claim 8, wherein predetermined positions on a curved line that f(n) - t1 shows are sampled so that the thickness that a straight line connecting each sample point shows is set to a minimum value of the thickness t of the light transmission layer in a corresponding refractive index, and

predetermined positions on a curved line that f(n) + t2 shows are sampled so that the thickness that a straight line connecting each sample point shows is set to a maximum value of the thickness of the sum of the light transmission layer in a corresponding refractive index, the space layer, and the information recording layer excluding the information recording layer which is closest to the substrate.

15. An optical disk apparatus comprising:

a semiconductor laser element emitting laser light

whose wavelength is 395 to 415 nm; and

a processing unit allowing the laser light from the semiconductor laser element to be emitted to the optical disk to perform recording processing and reproducing processing, for an optical disk which is constructed in such a manner that an information recording layer formed on a substrate is covered with a light transmission layer and in which the range of the thickness and the refractive index of the light transmission layer is set so that aberration due to a deviation of the thickness and the refractive index of the light transmission layer from each standard value falls within the range of certain acceptable values, wherein

the thickness t of the light transmission layer is set within the range of $f(n) - t1 \leq t \leq f(n) + t2$, employing function f(n) of the refractive index n of the light transmission layer and constants t1, t2 determined based on an acceptable value of aberration in the light transmission layer,

the refractive index of the light transmission layer is set within the range of 1.45 to 1.75,

the numerical aperture of a lens emitting laser light which is incident onto the light transmission layer is set to 0.65, and

the function f(n) is shown by

$$f(n) = \frac{A_1 \times n^3}{n^2 - 1} \times \frac{n^2 + A_2}{n^2 + A_3} \quad (\mu m)$$

employing constants A_1, A_2, A_3.

16. The optical disk apparatus according to claim 15, wherein the refractive index of the light transmission layer is set within the range of 1.5 to 1.7.

17. An optical disk apparatus comprising:

a semiconductor laser element emitting laser light whose wavelength is 395 to 415 nm; and

a processing unit allowing the laser light from the semiconductor laser element to be emitted to the optical disk to perform recording processing and reproducing processing, for an optical disk which is constructed in such a manner that a plurality of information recording layers are laminated by sandwiching a space layer having a light transmission property therebetween on a substrate and are covered with a light transmission layer, wherein

the thickness t of the light transmission layer is set to f(n) - t1 or more, employing function f(n) of the refractive index n of the light transmission layer and constants t1, t2 determined based on an acceptable value of aberration in the layer comprising the light transmission layer, the information recording layers, and the space layer,

the sum of thicknesses of the light transmission layer, the space layer, and the information recording

layer excluding the information recording layer which is closest to the substrate is set to f(n) + t2 or less,

the refractive index of the light transmission layer is set within the range of 1.45 to 1.75,

the refractive index of the space layer is set within the range of ±0.1 of the refractive index of the light transmission layer,

the numerical aperture of a lens emitting laser light which is incident onto the light transmission layer is set to 0.65, and

the function f(n) is shown by

$$f(n) = \frac{A_1 \times n^3}{n^2 - 1} \times \frac{n^2 + A_2}{n^2 + A_3} \quad (\mu m)$$

employing constants A_1, A_2, A_3.

18. The optical disk apparatus according to claim 17, wherein the refractive index of the light transmission layer is set within the range of 1.5 to 1.7.